3ND2283 Three-Phase Hybrid Microstepping Driver

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1. Product Overview

The 3ND2283X is a newly launched digital three-phase stepper motor driver that uses the latest 32-bit DSP technology. It primarily drives 86, 110, and 130 type three-phase hybrid stepper motors. It offers 16 microstepping options, with a maximum of 60,000 steps per revolution. The operating peak current range is 4.0A-10.0A, with 16 output current options, meeting the needs of most applications. Due to its built-in microstepping technology, it can achieve high microstepping effects even under low microstepping conditions, ensuring smooth operation at low, medium, and high speeds with low noise. It features half-current, over-voltage, and over-current protection circuits. The driver integrates an automatic parameter tuning function, which can automatically generate optimal operating parameters for different motors, maximizing motor performance. This driver is AC powered, with a recommended operating range of AC 110V-220V.

2. Product Features

1. Latest 32-bit DSP technology
2. Low vibration, low power consumption, and low noise for motors
3. Automatic motor parameter tuning function
4. Built-in high microstepping, very smooth operation at low speeds
5. Compatible with common anode, single pulse, or double pulse modes
6. Over-voltage, under-voltage, and short-circuit protection functions
7. Automatic current halving when stationary
8. Optocoupler isolated differential signal input
9. Automatic phase memory on power-off

3. Signal Interface Description

The 3ND2283X driver uses a differential interface circuit that can accommodate differential signals, single-ended common cathode, and common anode interfaces. It has a built-in high-speed optocoupler, allowing it to accept signals from long lines, open-collector, and PNP output circuits. The interface circuit diagram for open-collector and PNP output is as follows:
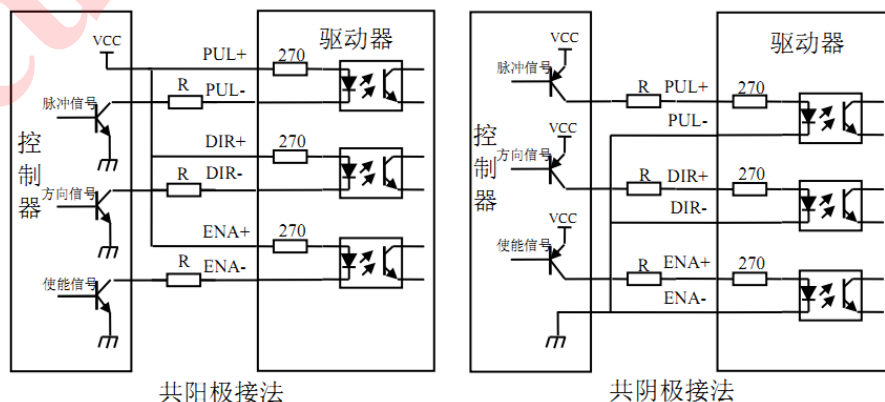

图 2　输入接口电路

Note: **The pulse and direction signals of this driver can adapt to a signal voltage of 5V-24V. With (R = 0), users do not need to connect an external resistor.**

Indicator light → ALM/POW
DR/PU
Run automatically → SW10
Singal/double pulse → SW9
SW8
Segmentation setting → SW7
SW6
SW5
SW4
Current settting → SW3
SW2
SW1

Alarm output → ALM−
ALM+
Enable input → ENA−
ENA+
Direction input → DIR−
DIR+
Pulse input → PUL−
PUL+

Step motor → MOTOR ⌐U
V
⌐W
Ground wire → ⊥ Pe
Power input → 220V ⌐AC
⌐AC

普菲德® PFDE

3ND2283

Digital Microstep Drive

电流设定

RMS(A)	SW1	SW2	SW3	SW4
4.0	off	off	off	off
4.6	off	off	off	on
4.8	off	off	on	off
5.2	off	off	on	on
5.6	off	on	off	off
6.0	off	on	off	on
6.4	off	on	off	off
6.8	off	on	on	on
7.2	on	off	off	off
7.6	on	off	off	on
8.0	on	off	on	off
8.4	on	off	on	on
8.8	on	on	off	off
9.2	on	on	off	on
9.6	on	on	on	off
10.0	on	on	on	on

细分脉冲数设定

PULSE	SW5	SW6	SW7	SW8
400	on	on	on	on
500	on	on	on	off
600	on	on	off	on
800	on	on	off	off
1000	on	off	on	on
1200	on	off	on	off
2000	on	off	off	on
3000	on	off	off	off
4000	off	on	on	on
5000	off	on	on	off
6000	off	on	off	on
10000	off	on	off	off
12000	off	off	on	on
20000	off	off	on	off
30000	off	off	off	on
60000	off	off	off	off

SW9：on=双脉冲模式
off=单脉冲模式

SW10：on=内部自检模式
off=外部脉冲模式

4. Applications

Suitable for various medium to large automation equipment and instruments, such as engraving machines, packaging and bag-making machines, cutting machines, CNC machines, automatic assembly equipment, etc.

5. Parameter Table

Microstepping Settings:

Number of Pulses	SW5	SW6	SW7	SW8
400	on	on	on	on
500	on	on	on	off
600	on	on	off	on
800	on	on	off	off
1000	on	off	on	on
1200	on	off	on	off
2000	on	off	off	on
3000	on	off	off	off
4000	off	on	on	on
5000	off	on	on	off
6000	off	on	off	on
10000	off	on	off	off
12000	off	off	on	on
20000	off	off	on	off
30000	off	off	off	on
60000	off	off	off	off

Operating Current Settings:

Peak Current	SW1	SW2	SW3	SW4
4.0A	off	off	off	off
4.6A	off	off	off	on
4.8A	off	off	on	off
5.2A	off	off	on	on
5.6A	off	on	off	off
6.0A	off	on	off	on
6.4A	off	on	on	off
6.8A	off	on	on	on
7.2A	on	off	off	off
7.6A	on	off	off	on
8.0A	on	off	on	off
8.4A	on	off	on	on
8.8A	on	on	off	off
9.2A	on	on	off	on
9.6A	on	on	on	off
10.0A	on	on	on	on

6. Control Signal Interface Circuit 3ND2283

Control Signal Interface Description:

Name	Function
PUL+ (5-24V) **PUL- (PUL)**	Pulse control signal: Effective on the rising edge of the pulse; supports 5V-24V pulse voltage signals without the need for an external resistor. The maximum response of this

	driver is 100KHZ. To reliably respond to pulse signals, the pulse width should be greater than 5µs.
DIR+ (5-24V)	Direction signal: High/low level signal, supports 5V-24V pulse voltage signals without the need for an external resistor. To ensure reliable motor direction change, the direction signal should be established at least 5µs before the pulse signal. The initial running direction of the motor is related to the motor wiring; swapping any phase winding (e.g., swapping A+ and A-) can change the initial running direction of the motor.
DIR- (DIR)	
FREE+ (5-24V)	Enable signal: This input signal is used to enable or disable the driver. It supports 5V-24V pulse voltage signals without the need for an external resistor. When ENA+ is connected to a high level and ENA- to a low level (or the internal optocoupler is conducting), the driver will cut off the current to each phase of the motor, putting the motor in a free state, and step pulses will not be responded to. When this function is not needed, the enable signal terminal can be left floating.
FREE- (ENA)	
ALM+	Enable signal: This input signal is used to enable or disable the driver. It supports 5V-24V pulse voltage signals without the need for an external resistor. When ENA+ is connected to a high level and ENA- to a low level (or the internal optocoupler is conducting), the driver will cut off the current to each phase of the motor, putting the motor in a free state, and step pulses will not be responded to. When this function is not needed, the enable signal terminal can be left floating.
ALM- (ALM)	

Driver Function Description:

Driver Function	Operation Instructions
Microstepping Setting	Set the driver microstepping number using the SW5-SW8 four DIP switches. When setting, the driver should be powered off first, then set and powered on again. There are 16 settings in total; please refer to the driver layout instructions for specific settings.
Automatic Half-Current Function	The driver automatically sets the current to halve when the motor stops, reducing motor heating.
Output Current Setting	Set the driver output current using the SW1-SW4 four DIP switches. When setting, the driver should be powered off first, then set and powered on again. There are 8 levels in total; please refer to the driver layout instructions for specific settings.
Pulse Mode	Set by the SW9 DIP switch. ON is dual pulse mode, OFF is single pulse mode. Dual pulse mode is recommended when the lead is long.
Self-Test Function	Set by the SW10 DIP switch. ON is automatic operation mode; when no pulse signal is added, the motor runs back and forth automatically, which can determine if there is a fault in the motor wiring. OFF is the mode for receiving external signals, the normal working state.
Motor Interface	Connect the three motor wires of the three-phase stepper motor to the corresponding U, V, W terminals on the driver. Swapping any two windings (e.g., swapping A+ and A-) can reverse the motor direction.
Power Interface	Uses AC power supply, working voltage range is AC 220V.
Indicator Light Description	The green light is the power indicator, always on, indicating normal power input. When the power input exceeds 280V, over-voltage protection is activated, the motor stops working, and the red light flashes quickly. After

	troubleshooting, power on again. When the power input is below 90V, under-voltage protection is activated, the motor stops working, and the red light and DR light are both on. After troubleshooting, power on again. When the motor is short-circuited, over-current protection is activated, the motor stops working, and the red light is always on. After troubleshooting, power on again.
Installation Instructions	The driver dimensions are 200*146*80mm, with a mounting hole distance of 192mm. Vertical installation is recommended. During installation, it should be closely attached to the metal cabinet to facilitate heat dissipation.

7. Dimensions (Unit: mm)